

EXHIBIT A

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY
NEWARK VICINAGE**

OCCIDENTAL CHEMICAL CORPORATION,

Plaintiff,

v.

21ST CENTURY FOX AMERICA, INC., *et al.*,

Defendants.

Hon. Judge Madeleine Cox Arleo
Hon. Magistrate Judge Joseph A. Dickson.

Civil Action No. 2:18-CV-11273 (MCA-JAD)

**DEFENDANT PITT-CONSOL CHEMICAL
COMPANY'S CORRECTED FIRST
SUPPLEMENTAL RESPONSES AND
OBJECTIONS TO PLAINTIFF'S
STANDARD SET OF
INTERROGATORIES**

Pursuant to Rules 26 and 33 of the Federal Rules of Civil Procedure and Local Rule 33.1, Defendant Pitt-Consol Chemical Company ("Pitt-Consol") hereby objects and responds to Plaintiff Occidental Chemical Corporation's ("OCC") Standard Set of Interrogatories as follows:

GENERAL STATEMENTS AND OBJECTIONS

1. Pitt-Consol objects to OCC's Definitions, Instructions and Interrogatories to the extent that they seek information protected by the attorney-client privilege or any other applicable privilege. Any inadvertent disclosure of privileged information shall not constitute a waiver of the attorney-client or any other applicable privilege.

2. Pitt-Consol objects to OCC's Definitions, Instructions and Interrogatories to the extent that they seek the discovery of the mental impressions, conclusions, strategies, opinions, research or legal theories of their attorneys or other representatives. Any inadvertent disclosure of work product shall not constitute a waiver of any work product protection.

3. Pitt-Consol objects to OCC's Definitions, Instructions and Interrogatories to the extent that they seek to alter or exceed the scope of the obligations placed on Pitt-Consol by the

21. Identify or describe Your document retention and destruction polic(ies) relating to the retention or destruction of business records relating to each Property at Issue or Operations identified in response to Interrogatory Nos. 1 or 2.

ORIGINAL ANSWER (JULY 8, 2019)

Pitt-Consol responds that, pursuant to Fed. Rule Civ. Pro. 33(d), the answer may be found in DuPont's Corporate Records and Information Management Policies that are being produced concurrently as part of Pitt-Consol's rolling production of documents. They may be found at PCCC-FED-0000007004 to PCCC-FED-0000007630.

22. Identify all Response Action costs for which You seek recovery in this litigation and for each, describe the purpose for which those costs were spent and what documentation You have establishing that You incurred and paid those costs.

ORIGINAL ANSWER (JULY 8, 2019)

Pitt-Consol objects to this Interrogatory as premature because no counterclaims or third-party claims have been asserted in this litigation and because the pending motions to dismiss will impact the type and scope of costs at issue. Pitt-Consol reserves the right to supplement this response as necessary.

CORRECTED SUPPLEMENTAL ANSWER - 12/4/2019

Pitt-Consol supplements its prior response as follows. Without waving the foregoing objections, Pitt-Consol states that it is a signatory to a Mutual Contribution Release Agreement ("MCRA") with Occidental Chemical Corporation ("OCC") and others relating to In re: Maxus Energy Corporation, et al., Case No 16-11501 (CSS) (Bankr. D. Del.). Under the MCRA, Pitt-Consol agreed to release OCC for claims of certain itemized amounts in exchange for a

corresponding release from OCC for certain itemized amounts claimed by OCC. Pitt-Consol maintains that the MCRA is enforceable. However, if the MCRA is deemed unenforceable, Pitt-Consol reserves its right to seek contribution from OCC for such otherwise released costs and itemized amounts, and to supplement this response accordingly.

Pitt-Consol has incurred reasonable and necessary response costs consistent with the national Oil and Hazardous Substances Pollution Contingency Plan (“NCP”, 40 C.F.R. Part 300 et seq.) at the Diamond Alkali Superfund Site. Pitt-Consol continues to incur costs under the categories described below; accordingly, this response will be supplemented further consistent with Fed. R. Civ. P. 26. Pitt-Consol also expects to offer expert testimony that will identify ongoing and recurring costs, and to prove its costs were reasonable, necessary, and consistent with the NCP.

Pitt-Consol has been a member of the Cooperating Parties Group (“CPG”), a group of companies organized to respond collectively to claims asserted against them by the United States, State of New Jersey and others in connection with the Diamond Alkali Superfund Site. The costs identified herein were incurred and paid collectively by the CPG. Documentation with respect to such costs includes work orders, invoices and other supporting documents of the CPG’s technical consultants, vendors and other suppliers, and internal accounting records maintained by the CPG. Recoverable legal fees are not included in this response, but may be provided in a supplemental response.

(a) 2007 RI/FS ASAOC. In 2007, the CPG, including Pitt-Consol, entered into an Administrative Settlement Agreement and Order on Consent (“ASAOC”) with EPA for a Remedial Investigation/Feasibility Study (“RI/FS”), in which the settling parties agreed to take over the performance of the 17-mile LPRSA RI/FS from EPA (see section (c), below). The

CPG's costs include costs of all activities required and approved by EPA, reimbursement of EPA's oversight costs, and costs for other activities in support of the RI/FS. These costs are identified at Exhibit B.

(b) 2012 RM 10.9 ASAO. In June 2012, the CPG, including Pitt-Consol, signed an ASAO for a time-critical removal action at river mile ("RM") 10.9 in Lyndhurst, New Jersey. The CPG's costs under this ASAO are identified in Exhibit C.

(c) Other RI/FS Costs. In 2004, the CPG, including Pitt-Consol signed an ASAO with U.S. EPA to fund EPA's work to on the RI/FS for the 17-mile LPR. CPG members (excluding Plaintiffs and its indemnitors) paid \$12.64 million to EPA. In addition to the 122(h) Settlement, the CPG incurred other recoverable response costs in furtherance of EPA's RI/FS during the period 2004 - 2007, identified in Exhibit D.

(d) PRP Search Costs. The CPG, including Pitt-Consol incurred and will continue to incur costs to identify potentially responsible parties ("PRPs") for Hazardous Substance contamination in the Diamond Alkali Superfund Site. The recoverable PRP Search Costs will be provided in a supplemental response.

23. Identify and Describe all settlements related to claims for environmental liability pertaining to any Property at Issue or Operations identified in response to Interrogatories Nos. 1 or 2 with non-parties (including, but not limited to Defendants voluntarily dismissed from the current litigation and governmental entities) regarding any Properties at Issue.

ORIGINAL ANSWER (JULY 8, 2019)

Pitt-Consol incorporates its response to Interrogatory No. 2. Without waiving the objections therein, Pitt-Consol responds that the litigation styled *New Jersey Department of*

EXHIBIT A

Summary of Sediment Datasets for the Lower Passaic River Study Area Remedial Investigation

Data Collection Event	Date of Collection	Number of Samples/ Locations ^a	Location (RM)	Depth (feet)	Sample Type	Analyses	Level of Validation	Known Data Issues or Limitations
Tierra – 1995 Remedial Investigation Sampling Program	1995	97 locations; 211 surface samples and 1,493 subsurface samples ^b	1 to 6.7	0 to 18.2	Core	Metals, PCBs, pesticides, TPH, PCDDs/PCDFs, SVOCs, herbicides, VOCs, cyanide, and geochronology	Unknown	
Honeywell International Sampling Programs	1999 to 2006	245 cores; 916 samples; 14 sediment trap samples	-3.3 to 1	0 to 27.4	Core, grab, and sediment trap	Metals; PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Unknown	No documentation
Tierra – Ecological Sampling Plan Programs	1999 to 2001	78 locations; 78 samples	1 to 7	0 to 0.5	Grab	AVS/SEM, cyanide, PCDD/PCDFs, grain size, herbicides, metals, organotin, PAH, PCB congeners, PCBs, pesticides, physical properties, SVOCs, TOC, and TPH		None known
USEPA/BioGenesis – Sediment Collection Program	2000	1 location; 1 sample		0 to 5.5	Core	AVS/SEM, cyanide, PCDD/PCDFs, grain size, herbicides, metals, organotin, PAH, PCB congeners, PCBs, pesticides, physical properties, SVOCs, TOC, and TPH	Unknown	Limited study; single bulk sediment sample
USEPA/TAMS/Earth Tech – Sediment Coring for Dredging Pilot Project	July 2004	16 locations; 46 samples	2.6 to 3.1; cores from RM 2.9	0 to 4	Core	VOCs, SVOCs, pesticides, PCB Aroclors, PCB congeners, herbicides, PCDDs, metals, TOC, percent moisture, percent solids, Atterberg limits, specific gravity, and grain size		None known
USEPA/MPI – Geotechnical Sediment Cores	May 2005	51 locations; 51 samples	0 to 16 (3 cores per transect every mile)	0 to 30.5	Core	Grain size (sieve and hydrometer analysis), Atterberg limits, bulk density, and TOC		None known
USEPA/MPI – Surface Sediment Grab Sampling Program	August to September 2005	34 samples	1 to 17.4 plus Dundee Lake	0 to 0.08	Grab	Beryllium-7 and cesium-137 analyses to investigate potential high-resolution coring locations in order to help date sediment deposition	Full	None known
USEPA/MPI – High-Resolution Sediment Coring Program	September to October 2005	14 locations; 1,323 samples	1.1 to 12.6 (for 5 cores with most analyses)	0 to 22.7	Core	14 stations analyzed for radiological dating (cesium-137); select core segments from a subset of five stations also analyzed for TAL metals, PAHs, PCB congeners, PCDDs, and pesticides; approximately 516 samples analyzed for cesium-137; 228 samples analyzed for metals; 148 samples analyzed for PAHs; and 109 samples analyzed for PCB congeners and PCDDs	Full	None known
PSEG West End Supplemental RI	2005	24 locations; 51 samples		0 to 1	Core and grab	Metals, SVOCs, VOCs, pesticides, and PCBs	Unknown	No documentation
Tierra – Newark Bay Phase I/Phase II (NBSA Remedial Investigation)	2005 and 2007	98 cores; 21 grabs	-9.3 to 0	0 to 29.5	Core and grab	Metals; PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Full	Outside of Lower Passaic River Study Area
Peninsula Resources – HRSA RI Sampling Program	2006	56 locations; 198 samples		0 to 12	Core	AVS/SEM, cyanide, PCDD/PCDFs, grain size, herbicides, hexavalent chromium, metals, PCB congeners, PCB Aroclors, pesticides, physical properties, SVOCs, TOC, TPH, VOCs, and radiochemistry	Full	None known
USEPA/MPI – Low-Resolution Sediment Coring Program	January 2006	10 locations; 130 samples	2.9 to 6.7	0 to 15.4	Core	Cesium-137, herbicides, TPH, TOC, geotechnical parameters, metals, PAHs, PCB congeners, PCB Aroclors, PCDDs, pesticides, VOCs, and SVOCs	Full	None known

Summary of Sediment Datasets for the Lower Passaic River Study Area Remedial Investigation

Data Collection Event	Date of Collection	Number of Samples/ Locations ^a	Location (RM)	Depth (feet)	Sample Type	Analyses	Level of Validation	Known Data Issues or Limitations
USEPA/MPI – Dundee Lake High-Resolution Coring Program	January 2007	6 locations; 120 samples	Dundee Lake	0 to 3	Core	Radiological dating analysis, PCDDs, PCB congeners, PAHs, pesticides, geotechnical parameters, and TAL metals	Full	None known
USEPA/MPI – EMBM	2007-2008	63 cores; 88 samples	1 to 18.4	0 to 9	Core	Metals; PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Full	None known
USEPA/MPI – Supplemental Coring Program	December 2007 to January 2008	32 surface grabs; 20 cores (40 core samples)	1 to 12.6 and Dundee Lake (for surface grabs); 8.4 to 14.5 (for cores)	0 to 9	Core and grab	Surface grabs analyzed for metals, TOC, grain size, and radiological parameters (surface grabs with confirmed beryllium-7 also analyzed for PCDDs, PCB congeners, PAHs, and pesticides); core samples analyzed for PCDDs, PAHs, pesticides, metals, TOC, PCB Aroclors, grain size, and radiological dating (12 core samples also analyzed for PCB congeners)	Full	None known
USEPA/MPI – RM 0 to RM 1 Surface Sediment Sampling	June 2008	18 stations; 36 samples	0 to 1	0 to 0.5	Grab	Radiological parameters, TOC, TAL metals, PCDDs, PCB congeners, PAHs, pesticides, and grain size	Full	None known
Low-Resolution Coring Program	July to December 2008	111 locations; 1,398 samples	0 to 17.4 ^c	0 to 30 ^d	Core and grab	PCDDs/PCDFs, radiological dating, herbicides, pesticides, SVOCs, VOCs, metals, organotins, low-resolution mercury and methylmercury, PCB congeners, PCB Aroclors, grain size, TOC, cyanide, sulfide, TPH, PAHs, AVS/SEM, physical testing, and nitrogen ammonia	Full	None known
Givaudan Sediment Sampling (prior to Lister Avenue Phases 1 and 2 Sediment Removal Action)	2012	6 locations; 66 samples	2.8 to 3.5	0 to 7	Core	Cesium-137	Full	None known
Benthic Program Surface Sediment and SQT Sampling (2009)	October to November 2009	111 locations (98 for SQT); 111 samples	0 to 17.4	0 to 0.5	Grab	Metals, SEM metals, butyltins, PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, herbicides, VOCs, TPH, TOC, grain size, percent moisture, and general chemistry (i.e., AVS, ammonia, cyanide, Kjeldahl nitrogen, phosphorus, and total sulfide)	Full	None known
Benthic Program Surface Sediment Sampling (2010)	August 2010	21 locations; 21 samples	0 to 17.4 (at locations where small forage fish were collected)	0 to 0.5	Grab	Metals, SEM metals, butyltins, PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, herbicides, VOCs, TPH, TOC, grain size, percent moisture, and general chemistry (i.e., AVS, ammonia, cyanide, Kjeldahl nitrogen, phosphorus, and total sulfide)	Full	None known
JDG – Sediment Sampling (prior to Lister Avenue Phases 1 and 2 Sediment Removal Action)	January 2011 to February 2011	3 high-resolution cores; 12 low-resolution cores; approximately 249 samples	2.8 to 3.5	0 to 18.5	Core	Metals, PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Full	None known
River Mile 10.9 Characterization	August 2011 to November 2011	54 cores; 818 samples	10.7 to 11.1	0 to 15.9	Core	Metals, PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Full	None known
Tierra – Focused Sediment Investigation (RM 10.9)	January 2012	6 cores; 70 samples	7.8 to 11.5	0 to 7	Core	PCDDs/PCDFs	Full	None known

Summary of Sediment Datasets for the Lower Passaic River Study Area Remedial Investigation

Data Collection Event	Date of Collection	Number of Samples/ Locations ^a	Location (RM)	Depth (feet)	Sample Type	Analyses	Level of Validation	Known Data Issues or Limitations
Low-Resolution Coring Program Supplemental Sampling Program	January to February 2012	85 locations; 569 samples; 755 geochronology samples	0 to 13	0 to 2.5; 3 stations to 4.5	Core and grab	PCDDs/PCDFs, pesticides, SVOCs, metals, organotin, low-resolution mercury, PCB congeners, grain size, TOC, cyanide, sulfide, TPH, PAHs, AVS/SEM, nitrogen ammonia, beryllium-7, cesium-137, lead-210, and potassium-40	Full	None known
River Mile 10.9 Addendum A	May 2012	15 cores; 59 samples	10.8 to 11.2	0 to 6.1	Core	Metals, PCBs, pesticides, PAHs, PCDDs/PCDFs, SVOCs, herbicides, VOCs, and TOC	Full	None known
Freshwater Reference SQT and Background Sediment Study	November 2012	24 SQT and 16 chemistry-only surface samples	17.6 (above Dundee Dam) to 21	0 to 0.5	Grab	Metals, SEM metals, butyltins, PAHs, SVOCs, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, TPH, TOC, grain size, percent moisture, and general chemistry (i.e., AVS, ammonia, cyanide, Kjeldahl nitrogen, phosphorus, and total sulfide)	Full	None known
Low-Resolution Coring Program Supplemental Sampling Program 2	September to October 2013	76 locations; 664 samples; 26 geochronology samples	7.2 to 14.6	0 to 20 ^d	Core (58) and grab (73)	PCDDs/PCDFs, pesticides, SVOCs, metals, organotin, low-resolution mercury and methylmercury, PCB congeners, grain size, TOC, cyanide, sulfide, TPH, PAHs, AVS/SEM, and ammonia, cesium-137 and lead-210 at two locations	Full	None known

Notes:

Sources consulted to compile the information presented in the table include: Terra Solutions, Inc. (2003, 2004), Battelle (2005), The Louis Berger Group (2014), and publicly available websites and databases (e.g., ourpassaic.org).

- a. Numbers are approximate and may vary depending on how quality assurance samples were counted.
b. Surface samples are those taken within the top 0.5 foot of sediment (includes high vertical-resolution geochronology samples).
c. Samples from above Dundee Dam, Third River, Saddle River, Second River, an unnamed tributary, and former Dundee Canal, including Weasel Brook, were also included in this sample count.
d. Cores were collected to refusal or parent material; maximum core length was 30 feet. Grabs were collected to 0.5 feet.

AVS/SEM: acid volatile sulfide/simultaneously extracted metal

EMBM: Equilibrium Mass Balance Model

HRSA: Hackensack River Study Area

JDG: Joint Defense Group

MPI: Malcolm Pirnie, Inc.

NBSA: Newark Bay Study Area

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

PCDD: polychlorinated dibenzo-p-dioxin

PCDF: polychlorinated dibenzofuran

PSEG: Public Service Enterprise Group

RI: Remedial Investigation

RM: River Mile

SQT: Sediment Quality Triad (chemistry, toxicity, and benthic invertebrate community)

SVOC: semivolatile organic compound

TAL: target analyte list

Tierra: Terra Solutions, Inc.

TOC: total organic carbon

TPH: total petroleum hydrocarbon

USEPA: U.S. Environmental Protection Agency

VOC: volatile organic compound

Summary of Surface Water and CSO Datasets for the Lower Passaic River Study Area Remedial Investigation

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Analyses	Level of Validation	Known Data Issues or Limitations
Surface Water							
NIDEF/USGS - NTRWP/CARP	June 22, 2000; December 15, 2000; March 14, 2001; and October 17, 2001	4 samples (2 baseflow, 1 variable flow, and 1 stormflow)	Passaic River at Little Falls (adjacent to USGS gage station 01389500)	Large volume and TOPS sampling	Water: SSC, DOC, POC, specific conductance; water and solids: PCB congeners, PCDD/PCDF congeners, pesticides, PAHs, cadmium, lead, mercury, and methyl-mercury	Unknown	Upstream of Lower Passaic River Study Area; limited temporal coverage
MPI - Hydrodynamic Survey (Mooring) Water Column Sampling	November 2004 and February 2005	3 locations; 26 samples	8.6, 10, and 11.5	Grab	Grab samples collected to supplement hydrodynamic data from moored instruments; samples analyzed for POC, TDS, TOC, TSS, and VSS	Full	None known
USEPA/MPI - High-Flow Event Sampling	October 12, 2005	2 locations; 143 samples	Jackson St. and Ackerman Ave. Bridges	Grab	One-day sampling event to evaluate solids transport during a major precipitation event; samples analyzed for TDS, TOC, TSS, and VSS	Full	Limited temporal scale
USEPA/MPI - Large-Volume Water Column Sampling	October 2005	1 location; 12 samples	2.5	Large volume	PCB congeners, PCDDs, pesticides, TSS, DOC, and POC	Partial	Comparison study to evaluate TOPS, Infiltrax, and other large-volume sampling techniques; summary narrative available
MPI - SPMD Deployment	October to November 2005	4 locations; 8 samples	17; 3 tributaries ^b	Composite	SPMD deployments intended to measure dissolved-phase organics; extracts analyzed for PCB congeners, PAHs, PCDDs, and pesticides	Partial	Semi-quantitative, indirect measure of dissolved phase hydrophobic chemicals
MPI - Small-Volume Water Column Sampling	November 2005	8 locations; 267 samples	1, 2.5, 4.5, 10.5, 17; and 3 tributaries ^b	Grab and composite	Grabs analyzed for ammonia, BOD, herbicides, chlorophyll-a, COD, cyanide, ortho-phosphorus and total phosphorus, TKN, TSS, SVOCs, and VOCs; composites analyzed for DOC, POC, and metals	Partial	None known
U.S. Geological Survey - Surface Water Sampling for Environmental Dredging Pilot	December 2005	1 location	Harrison Reach between 2.6 and 3.0	Grab, Isco, TOPS, and composite	TSS, POC, DOC, chloride/bromide, dissolved and total metals, PCDD/PCDF congeners, and pesticides	Unknown	Limited to the Harrison Reach area with one location in the Lower Passaic River Study Area
Chemical Water Column Monitoring Program - Small Volume	August 2011 to June 2013 (8 phases of field work)	9 locations, 8 events; 756 samples	0 to 17.4, Dundee Lake, Third River, Second River, and Saddle River	Grab	PCDD/PCDFs, PCBs (homologs and congeners), mercury (total and dissolved), TAL metals (total and dissolved), POC, DOC, hardness, SSC, TOC, chlorophyll-a, alkalinity, sulfate, total sulfide, TDS, chloride, PAHs and alkylated PAHs, organochlorine pesticides (not including toxaphene), SVOCs, VOCs, methyl mercury (total and dissolved), titanium, butyltins, cyanide, hexavalent chromium (dissolved only), TKN, ammonia, and total phosphorus; pathogens and bacteria	Partial	None known
Chemical Water Column Monitoring Program - High Volume	December 2012 to June 2013 (2 phases of field work)	7 locations, 2 sampling rounds; 6 samples	4.2, 10.2, and Dundee Lake	Grab	PCDD/PCDFs, PCBs, SSC, POC, and DOC	Full	None known
Physical Water Column Monitoring Program	October 2009 to November 2010	6	0 to 13.5, Dundee Lake	Mooring, transect surveys, and grab samples	SSC, DOC/POC, optical backscatter (OBS), DO, temperature, conductivity, and depth	Partial	None known
Dissolved Oxygen Study	August to December 2012	13	0.7, 2.1, 2.3, 4.2, 5.5, 8.8, 9.0, 9.6, 12.8, 14.7, 17.7, and 18.3	Mooring	DO, temperature, pH, conductivity, and turbidity	Unvalidated	None known
CSOs							
Tierra Solutions, Inc. - CSO Sampling Program	September to November 1997	11	1, 3, 4, and 5	Grab	Metals, organics, inorganics, pesticides, PCBs, herbicides, and physical tests	Unvalidated	Limited documentation

Summary of Surface Water and CSO Datasets for the Lower Passaic River Study Area Remedial Investigation

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Analyses	Level of Validation	Known Data Issues or Limitations
GLEC/NJDEP – NJTRWP/CARP CSO Sampling	2001 to 2004	35	5 SWOs and 9 CSOs	Grab	PCDDs/PCDFs, metals, PAHs, PCBs, pesticides, and wet chemistry	Unknown	Unknown quality
MPI – 2008 CSO/SWO and Tributary Storm Event Sampling	January 11, February 1, February 13, and March 8, 2008	20 locations; 17 SWO, 13 CSO, 8 tributaries, and 10 sediment trap samples	8 SWOs, 5 CSOs, 3 tributaries ^b , and 4 sediment traps	Large-volume aqueous and sediment	PCDDs, PCB congeners, PAHs, pesticides, metals, TOC or POC, grain size, and radiological parameters	Partial	None known

Notes:

Sources consulted to compile the information presented in the table include: Tierra Solutions, Inc. (2003, 2004), Battelle (2005), The Louis Berger Group (2012, 2014), and site databases (e.g., [ourpassaic.org](http://www.ourpassaic.org) and <http://www.carpweb.org>).

a. Numbers are approximate and may vary depending on how quality assurance samples were counted.

b. Reference to "3 tributaries" consists of head-of-tide locations on Second River, Third River, and Saddle River.

MPI: MatcoIn Pirnie, Inc.

NJDEP: New Jersey Department of Environmental Protection

NJTRWP: New Jersey Toxics Reduction Work Plan

OBS: Optical backscatter

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

PCDD: polychlorinated dibenzo-p-dioxin

PCDF: polychlorinated dibenzofuran

ISCO: Great Lakes Environmental Center

ISCO: Teledyne Isco Company sampler

POC: particulate organic carbon

RM: River Mile

SPMD: semi-permeable membrane device

SSC: suspended solid concentration

SWOC: semivolatle organic compound

SWO: stormwater outfall

TAL: target analyte list

TDS: total dissolved solids

TKN: total Kjeldahl nitrogen

TOC: total organic carbon

TOPS: trace organics platform sampler

TSS: total suspended solids

USEPA: U.S. Environmental Protection Agency

USGS: U.S. Geological Survey

VOC: volatile organic compound

VSS: volatile suspended solids

Summary of Biota Tissue Collection Events for the Lower Passaic River Study Area

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Species Collected	Tissue Type per Species	Analyses	Level of Validation	Known Data Issues or Limitations
NJDEP – Toxics in Biota Monitoring Program	1986 to 2004	Varied per event	Approximately 0 and 16	Fish and crab tissue	American eel	Fillet – skin off	PCBs, chlordane, DDTs, and 2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin	Unknown	Limited to four species at limited locations in the LPRSA (Newark Bay [RM 0] and Monroe Street Bridge [RM 16])
					Carp	Fillet			
					Striped bass	Fillet			
					Blue crab	Hepatopancreas and muscle			
New York State Department of Environmental Conservation – PREmis Database	1993	1	0.1	Fish and invertebrate tissue	Blue crab	Hepatopancreas and muscle	PCDDs/PCDFs, metals, PCBs, pesticides, and lipids	None	No validation: limited to blue crab, oyster, and three fish species (all fillet samples) at one location near the mouth of the LPR
					Oyster	Soft tissue			
					Butterfish	Fillet			
					Scup	Fillet			
Tierra Solutions, Inc. – Passaic 1995 Biological Sampling Program	1995	13	1.1 to 4.5	Fish and crab tissue	Striped bass	Fillet	PCDDs/PCDFs, metals, PAHs, PCBs, SVOCs, pesticides, organometals, cyanide, and TPH	Full	Limited to three species collected at locations in the estuarine zone of the LPRSA only
					Blue crab	Edible muscle and hepatopancreas			
					Mummichog	Hepatopancreas			
					Striped bass	Fillet			
					Adult striped bass	Fillet – skin off			
					Whole body	Whole body			
					Atlantic menhaden	Whole body			
					Fillet – skin off	Fillet – skin off			
					Bluefish	Whole body			
					Edible muscle	Edible muscle			
Tierra Solutions, Inc. – RI-ESP Biota Sampling Program	October 1999	154	1.0 to 6.9	Fish, crab, and mussel tissue	Hepatopancreas	Hepatopancreas	PCDDs/PCDFs, herbicides, metals, PAHs, PCBs, pesticides, SVOCs, and organometals	Full	Limited to RM 1 to RM 7 of the LPRSA
					Crab	Whole body – soft tissue			
					Juvenile striped bass	Whole body			
					Mummichog	Whole body			
					Silverside	Whole body			
					Transplant ribbed mussel	Whole body – soft tissue			
					White perch	Whole body			
					Adult striped bass	Fillet – skin off			
					Whole body	Whole body			
					American eel	Whole body			
May 2000	May 2000	41	1.0 to 6.8	Fish and crab tissue	American eel	Edible muscle	PCDDs/PCDFs, herbicides, metals, PAHs, PCBs, pesticides, SVOCs, and organometals	Full	Limited to RM 1 to RM 7 of the LPRSA
					Crab	Whole body – soft tissue			
					Mummichog	Whole body			
					White perch	Fillet – skin off			
August 2001	August 2001	13	6.0 to 6.9	Fish tissue	American eel	Whole body	PCDDs/PCDFs, herbicides, metals, PAHs, PCBs, pesticides, SVOCs, and organometals	Full	LPRSA to RM 6.0 to RM 6.9 of the
					Brown bullhead	Fillet – skin off			

Summary of Biota Tissue Collection Events for the Lower Passaic River Study Area

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Species Collected	Tissue Type per Species	Analyses	Level of Validation	Known Data Issues or Limitations
CARP – 2000 to 2004 Harbor Fish/Crustacean Collection	2000 to 2004	109	2.6	Fish and crustacean tissue	American eel	Whole body, without head/viscera	PCDDs/PCDFs, metals, PAHs, PCBs, and pesticides	Partial	Limited to the lower portion of the LPRSA
					Mummichog	Whole body			
					White perch	Whole body – homogenized			
						Whole body, without head/viscera			
					Blue crab	Whole body			
						All edible tissue			
						Hepatopancreas			
					Opossum shrimp	Muscle tissue			
						Whole body			
					Ribbed mussel	Whole body – depurated			
USEPA – EMAP and REMAP within the National Coastal Assessment – Northeast/New Jersey Coast	2000 and 2002	2	Regional	Crab and lobster tissue and fish tissue	White perch and blue crab	All soft parts	Metals, DDTs, PCBs, and pesticides	Full ^b	Crab tissue chemistry data available at two stations in the LPRSA and one station in Newark Bay near the mouth of the river; limited to two species (white perch and blue crab) at two locations in the LPRSA
						Whole body			
					Seven spine bay shrimp	Whole body – depurated			

Summary of Biota Tissue Collection Events for the Lower Passaic River Study Area

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Species Collected	Tissue Type per Species	Analyses	Level of Validation	Known Data Issues or Limitations
2009 Fish and Decapod Tissue Collection	August to September 2009	299	0 to 17.4	Fish and crab tissue	American eel	Fillet – skin off	Metals: butyltins, PAHs, alkylated PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs, PCDFs, organochlorine pesticides, lipids, and percent moisture	Full and summary	None known
					Blue crab	Whole body			
						Carcass			
						Hepatopancreas only			
						Muscle only			
					Brown bullhead	Muscle/hepatopancreas			
						Carcass			
						Whole body			
					Carp	Fillet – skin on			
						Whole body			
					Channel catfish	Fillet – skin off			
					Largemouth bass	Carcass			
						Fillet – skin on			
					Northern pike	Fillet – skin on			
					Smallmouth bass	Carcass			
						Fillet – skin on			
2009 Laboratory Bioaccumulation Tissue ^c	December 2009	19	0 to 15	Worm tissue	<i>Nereis virens</i> (estuarine) and <i>Lumbriculus variegatus</i> (freshwater)	Whole body – depurated	Metals: butyltins, PAHs, SVOCs, PCB congeners, PCDDs, PCDFs, organochlorine pesticides, lipids, and percent moisture	Full	Limited tissue mass was available for some freshwater worm tissue samples and a reduced analyte priority list was implemented; an additional sample was not analyzed because of insufficient tissue mass
2010 Spring Small Forage Fish Reconnaissance Sampling	May 2010	10	2 to 5	Small forage fish	Mummichog	Egg	Lipid	Summary	None known

Summary of Biota Tissue Collection Events for the Lower Passaic River Study Area

Data Collection Event	Date of Collection	Number of Samples ^a	Location (RM)	Sample Type	Species Collected	Tissue Type per Species	Analyses	Level of Validation	Known Data Issues or Limitations
2010 Small Forage Fish Tissue Collection	June to August 2010	31	0 to 17.4	Fish tissue	Mummichog, gizzard shad, pumpkinseed, silver shiner, spottail shiner, white perch, and mixed forage fish ^d	Whole body	Metals: butyltins, PAHs, alkylated PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, lipids, and percent moisture	Full and summary ^e	None known
2011 Caged Bivalve Study	March to June 2011	8	0 to 17.4	Mussel tissue	Eastern elliptio mussel (freshwater) and ribbed mussel (estuarine)	Soft tissue	Metals: butyltins, PAHs, alkylated PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, lipids, and percent moisture	Full	Survival was low for estuarine mussels in the transitional zone due to intolerance of low salinity conditions
2012 Background Fish Tissue Survey	October 2012		17.4 above Dundee Dam to 21.5	Fish tissue	White perch, brown bullhead, channel catfish, common carp, white sucker, American eel, smallmouth bass, northern pike, banded killifish, pumpkinseed, and silver shiner	Whole body, fillet, and carcass depending on species and size	Metals: butyltins, PAHs, alkylated PAHs, SVOCs, PCB Aroclors, PCB congeners, PCDDs/PCDFs, organochlorine pesticides, lipids, and percent moisture	Full	None known

Notes:

Sources consulted to compile the information presented in the table include: USEPA EMAP and USEPA REMAP, Region 2, within the National Coastal Assessment – Northeast/New Jersey Coast, available online at <http://www.epa.gov/emap/ncs/emap/ncs/about.html>; Terra Solutions, Inc. (2003); CARP (<http://www.carpweb.org/main.html>); NIDEP (1990, 1993); Belton et al. (1985); Horwitz (2005, 2006); NIDEP 2004 Routine Monitoring Program for Toxics in Fish: Year 2 – Estuarine and Marine Waters (<http://www.state.nj.us/dep/dsr/2004data.htm>); and PREmis database (created January 21, 2006; available at <http://ourpassaic.org>).

a. Numbers are approximate and may vary depending on how quality assurance samples were counted.

b. Methods used to validate data collected in USEPA's Environmental Monitoring Assessment Program are available at <http://www.epa.gov/emap/ncs/html/docs/qap/qapplan.html>.

c. Laboratory bioaccumulation tests were conducted using sediment collected from the LPRSA during the 2009 Surface Sediment Sampling Program.

d. Four composite samples were composed of multiple species of small forage fish, including Atlantic silverside, gizzard shad, inland silverside, smallmouth bass, striped bass, striped mullet, spottail shiner, tessellated darter, or white perch.

e. Data generated by the PAH (CARB 429 Mod), PCB congener (USEPA 1668B), PCDD/PCDF (USEPA 1613B), and organochlorine pesticide (USEPA 1699 Mod) analyses, which all used high-resolution gas chromatography/high-resolution mass spectrometry instruments, underwent full data validation. For other chemical groups, at least 20% of the data received full-level validation and up to 80% received summary-level validation.

CARP: Contamination Assessment and Reduction Project

DDT: dichlorodiphenyltrichloroethane

EMAP: Environmental Monitoring Assessment Program

ESP: ecological sampling program

LPR: Lower Passaic River

LPRSA: Lower Passaic River Study Area

NIDEP: New Jersey Department of Environmental Protection

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

PCDD: polychlorinated dibenzo-*p*-dioxin

PCDF: polychlorinated dibenzofuran

REMAP: Regional Environmental Monitoring and Assessment Program

RI: Remedial Investigation

RM: River Mile

SVOC: semivolatile organic compound

TPH: total petroleum hydrocarbon

USEPA: U.S. Environmental Protection Agency

Summary of Biological Community and Habitat Quality Investigations in the Lower Passaic River Study Area

Data Collection Event	Dates of Collection	Location (RM)	Number/Description of Sampling Locations	Description
Tierra Solutions, Inc. – RI-ESP Avian Community Survey	1999 to 2000	1 to 7	4 survey areas	Surveyed LPRSA bird community during four seasonal events. Birds were identified by species, life stage, location, and counted.
Avian Community Seasonal Surveys	August 2010, October 2010, January 2011, and May 2011	0 to 17.4	Transects divided evenly between the west/south and east/north banks	Qualitative survey of birds observed in habitats using transects that were surveyed a total of three times (i.e., at sunrise, midday, and sunset).
Tierra Solutions, Inc. – Phase 1 Toxicity Identification Evaluation	July 2000	1 to 7	5	Investigated sediment toxicity to benthic invertebrates in the LPRSA. Conducted sediment and porewater toxicity tests using amphipod, <i>Ampelisca abdita</i> , included in sediment quality triad assessment.
Tierra Solutions, Inc. – RI-ESP Benthic Invertebrate Community Survey	Fall 1999 and spring 2000	1 to 7	15 LPRSA; 3 reference area stations	Evaluated structure and composition of benthic invertebrate community in LPRSA and compared to Mullica River (reference area). Included in sediment quality triad assessment.
NJDEP – Ambient Biomonitoring Network	1993, 1998, and 2006	Approximately 17 (at Dundee Dam), plus 6 stations on tributaries (e.g., Second, Third, and Saddle rivers)	7	Taxonomic identification of benthic invertebrates was conducted.
USEPA – EMAP within the National Coastal Assessment – Northeast/New Jersey Coast	2000 and 2002	Between RM 5 and RM 11	1 location with 1 grab collected	Conducted taxonomic identification and measured biomass of benthic invertebrates from numerous stations along New Jersey coast. Benthic community data were limited to three stations in the LPRSA and one station in Newark Bay near the mouth of the river.
USEPA – REMAP, Region 2, within National Coastal Assessment	1998 and 1999	2	1 location	Conducted taxonomic identification and measured biomass of benthic invertebrates from numerous stations in Region 2. Benthic community data were limited to one station in LPRSA and one station in Newark Bay near the mouth of the river.
NOAA Northeast Fisheries Science Center – Benthic Macrofauna and Associated Hydrographic Observations Collected in Newark Bay, New Jersey	Between June 1993 and March 1994	Mouth of the Passaic River	2	Conducted taxonomic identification of benthic invertebrates from numerous stations in Newark Bay. Benthic community data were limited to two stations in Newark Bay near the mouth of the river.
Aqua Survey – Taxonomic Identification of Benthic Invertebrates from Sediment Collected in the Lower 17 Miles of the LPR in Support of the Lower Passaic Restoration Project	June to July 2005	0 to 16	28	Benthic invertebrate fauna samples were collected at 28 sampling locations (25% of SPI survey locations) that were evenly distributed throughout the LPR. A subset of 100 organisms was subsampled from each sample, counted, and identified to the lowest practical taxon (family in most cases).
Benthic Invertebrate Community Seasonal Surveys	October to November 2009, June 2010, and July to August 2010	0 to 17.4	100 locations in fall 2009; 33 locations in spring and summer 2010	Benthic invertebrate community data from surface sediment grab samples (0 to 0.5 foot). A component of an SQT study (see Table 2-1 for sediment chemistry).
Sediment Toxicity Study	October to November 2009	0 to 17.4	98 locations	A component of an SQT study (see Table 2-1 for sediment chemistry).
Freshwater Reference SQT and Background Sediment Study	November 2012	17.6 (above Dundee Dam) to 21	24 locations	Benthic invertebrate community survey and sediment toxicity components of SQT assessment at freshwater reference sites in the Passaic River above Dundee Dam.
Burger – 1999 Survey of Anglers (Newark Bay Complex)	1999	Newark Bay Complex	6 locations (1 near the mouth of LPR)	Anglers (267) were interviewed to assess consumption patterns and identify the reasons why people fish and crab, as discussed in Burger (2002).
Tierra Solutions, Inc. – Creel/Angler Survey	2000 and 2001	1 to 7	Boat-based survey, 143 days; land-based survey, 101 days	Conducted boat-based counts and land-based interviews to provide data on the location and frequency of fishing. The land-based interviews provided more detailed data on a per-angler basis, including number of trips per year, number of fish or crab caught and eaten, and general demographics.
NJDEP – 1995 Urban Angler Survey (Newark Bay Complex)	1995	Newark Bay Complex	26 fishing and crabbing locations (2 in LPR)	Angler survey was performed to assess angler awareness and understanding of fish consumption advisories.

Summary of Biological Community and Habitat Quality Investigations in the Lower Passaic River Study Area

Data Collection Event	Dates of Collection	Location (RM)	Number/Description of Sampling Locations	Description
Tierra – RI-ESP Fish Community Survey	1999 and 2000	1 to 6	15	Characterized LPRSA fish community during two events: late summer/early fall 1999 and spring 2000. Coordinated effort with fish tissue sampling program; community data were used to select target species for tissue collection. Qualitative pathology information was compiled on fish not collected for tissue chemistry analyses.
NIDEP – Fish IBI Report: 2004 Sampling	Summer and fall 2004	15-5	1	Fish community survey data were compiled.
USEPA – Fish Abundance Data for New Jersey	August 2000	99	2	USEPA coastal assessment program collected fish community survey data.
USEPA – EMAP within the National Coastal Assessment – Northeast/New Jersey Coast	1990 and 1993	Lower 6 miles of the Passaic River	1 location with 3 grabs collected	Conducted taxonomic identification and measured biomass of benthic invertebrates from numerous stations in Virginian Province.
USACE – Flood Protection Feasibility: Main Stem Passaic River Volume III, Phase I	Spring and summer 1981	Mouth of Newark Bay up to the Dundee Dam, including the locations on the tributaries (Second, Third, and Saddle rivers)	13	Data were from USACE fish community survey, which targeted only anadromous fish.
Princeton Aqua Science – Biocommunities Study	1981 and 1982	9	3	Data were from fish community survey, which targeted only one fish species (mummichog).
Fish Community Seasonal Surveys	August to September 2009, January to February 2010, and June to July 2010	0 to 17.4	8 reaches (5 in estuarine zone and 3 in freshwater zone)	Surveys of fish communities to determine relative abundance, structure, and indices of the fish community over multiple seasons; included gross internal and external pathology evaluations on select fish.
Tierra – RI-ESP Habitat Characterization Survey of LPRSA	Fall 1999 and spring 2000	1 to 7	Continuous shoreline observations of both banks	Characterized shoreline habitats in LPRSA according to four categories: aquatic vegetation, bulkhead, riprap, and mixed vegetation. Included delineation of mudflats.
Germano & Associates – SPI Survey of Sediment and Benthic Habitat Characteristics of the LPR	June 2005	0 to 16	134	Characterized the physical and biological conditions of surface sediments to assess the river's intertidal and subtidal benthic habitats. Sampling occurred along 27 transects, 4 to 5 sampling locations per transect, from Newark Bay to Garfield, New Jersey.
Tierra – Ecological Benchmarking Assessment of LPRSA	2005	0 to 17	Continuous survey of 17 miles of LPRSA	Characterized and quantified the physical and ecological attributes, or "benchmarks," of LPRSA wetland and aquatic habitats for restoration planning purposes.
USACE – Vegetation Sampling, Wetland Delineation, and Bio-Benchmark Survey	2008	0 to 17, plus areas on tributaries and upstream of Dundee Dam	27	Conducted terrestrial vegetation surveys and wetland delineations at three locations and identified bio-benchmarks in the LPRSA. Three reference areas (identified on the basis of wetland vegetation) were also identified within and outside of the.
Habitat Identification Survey	September 2010	0 to 17.4, locations along 3 tributaries	Continuous shoreline observations of both banks	Qualitative survey of shoreline features and vegetation within the LPRSA and LPRSA tributaries.

Notes:

Sources consulted to compile the information presented in the table include: USEPA EMAP and USEPA REMAP, Region 2, within the National Coastal Assessment – Northeast/New Jersey Coast, available online at <http://www.epa.gov/emap/nca/html/about.html>; USACE (1987), NIDEP (1990, 1993), Belton et al. (1985), Horvitz (2005, 2006), Tierra Solutions, Inc. (2003, 2004), Battelle (2005), Stehlik et al. (2005), MPI (2007), Germano & Associates (2005), Shisler et al. (2008), Burger (2002), and site databases (e.g., ourpassaic.org).

EMAP: Environmental Monitoring and Assessment Program
 ESP: ecological sampling program
 IBI: index of biotic integrity
 LPR: Lower Passaic River
 LPRSA: Lower Passaic River Study Area
 MPI: Malcolm Pirnie, Inc.
 NIDEP: New Jersey Department of Environmental Protection
 NOAA: National Oceanic and Atmospheric Administration

REMAP: Regional Environmental Monitoring and Assessment Program
 RI/FS: Remedial Investigation/Feasibility Study
 RM: River Mile
 SPI: Sediment Profile Imaging
 SQT: Sediment Quality Triad (chemistry, toxicity, and benthic invertebrate community)
 Tierra: Tierra Solutions, Inc.
 USACE: U.S. Army Corps of Engineers
 USEPA: U.S. Environmental Protection Agency

Summary of Bathymetry, Hydrodynamic, and Geophysical Investigations in the Lower Passaic River Study Area

Event	Date(s)	Location (RM)	Description
USACE Bathymetry Surveys	1932	10.7 to 11.5	Digitized from charts on transects spaced approximately 25 feet apart.
USACE Bathymetry Surveys	1948	10.4 to 11.3	Digitized from charts on transects spaced approximately 200 feet apart.
USACE Bathymetry Surveys	1949 and 1950	1949: RM 2.5 to RM 5; 1950: RM 5 to RM 6.8	Digitized from maps of point data with approximately 30-foot spacing in a grid pattern; post-dredge data.
USACE Bathymetry Survey	1966	RM 2.3 to RM 7.8	Digitized from maps of point data on transects spaced approximately 90 feet apart.
USACE Bathymetry Survey	1975 (pre-dredge) and 1976 (post-dredge)	RM 8 to RM 12.5	Digitized from maps of point data on transects spaced approximately 100 feet apart.
USACE Bathymetry Survey	1989	0 to 15	Digitized from maps of point data on transects spaced approximately 100 feet apart.
Tierra Solutions, Inc. – Single-beam Bathymetry Surveys	1995, 1996, 1997, 1999, and 2001	RM 1 to RM 7	Single-beam surveys on 100-foot-spacing transects with points taken every 2 feet. Single-beam surveys were used for direct comparison at co-incident transects.
USACE – Single-beam Bathymetry	2004	RM 0 to RM 17.4	Single-beam surveys using 100-foot spacing of transects; performed by Rogers Surveying, Inc.
Aqua Survey, Inc. – Pilot Study Survey Area Single-beam survey	2004	Between Jackson Street Bridge and New Jersey Turnpike	Single-beam survey using 25-foot spacing transects bank-to-bank (mean lower water) to cover the Pilot Study Dredging Area.
Aqua Survey, Inc. – Geophysical Survey for NIDOT	2005	RM 0 to RM 17	Five longitudinal lines and 51 transects; side scan sonar, fathometer, magnetometer, gradimeter, and sedimentological properties for 275 short push cores and for deep cores.
Gahagan & Bryant Associates, Inc. - Multi-beam Survey	2007	RM 0 to RM 14.2	Survey obtained 100% coverage in navigable water with a 5-foot grid.
Gahagan & Bryant Associates, Inc. – Single-beam Survey	2007	RM 0.5 to RM 8.2; RM 14.3 to RM 16.5	Survey was performed to duplicate the methods and equipment used during previous surveys of the river so that comparisons could be made with previous single-beam surveys. 100-foot spacing of transects; points were taken every 0.5 foot.
Gahagan & Bryant Associates, Inc. – Multi-beam and Single-beam Surveys	2008	RM 0 to RM 14	Co-located 2008 survey with 2007 survey in order to correlate 2007 data. Single-beam survey was conducted along 13 transects for a direct comparison with pre-2007 data. Multi-beam survey included main channel and side slopes on a 5-foot grid.
Gahagan & Bryant Associates, Inc. – Multi-beam Survey	2010	RM 0.5 to RM 14.2	Survey obtained 100% coverage in navigable water with a 5-foot grid.
Gahagan & Bryant Associates, Inc. – RM 10.9 Characterization	2011	RM 10 to RM 12	Multi-beam (RM 10 to RM 12) and single-beam (RM 10.6 to RM 11.3; 86 transects at 50-foot intervals). Performed in July 2011; this survey occurred prior to storm Irene.
Gahagan & Bryant Associates, Inc. – Post-Irene Survey	2011	RM 0.5 to RM 14.2	Multi-beam; single-beam on transects from RM 1.6 to RM 8.0, as previously performed in 2008 and 2010.
Gahagan & Bryant Associates, Inc. – Multi-beam and Single-beam Surveys	2012	RM 0.5 to RM 14.2	Single-beam performed in shallow (2 to 6 feet) areas over RM 0 to RM 11; multi-beam from RM 0 to RM 14; intended to characterize bed under extended low river flow conditions.
Rutgers – Hydrodynamic Survey July 2004 to July 2005	July 2004 to July 2005	Lower 6 miles of the Passaic River	Measured river flow, sediment movement, and seasonal changes in salinity and temperature.
MPI – Hydrodynamic Survey	November 2004 to May 2005	Upper 11 miles	Hydrodynamic data were collected as part of the LPRSA RI/FS. Work involved three buoys (moorings at RM 8.6, RM 10, and RM 11.5) deployed from November 2004 to October 2005. Data collected included surface and bottom salinity (conductivity) and suspended solids (TSS and VSS). Vertical velocity profile data collected during deployment are incomplete.
Tierra – Hydrodynamic Studies	1995 to 1996	0.5 to 7.9	Water-level fluctuations were documented at three tidal gages from April 1995 to June 1996. Velocity profile data were collected at eight cross sections from July 1995 to May 1996. Moored current meter data (including subset of temperature and salinity) were collected at three locations (from RM 1.4 to RM 6.8) from July 1995 to May 1996. Temperature, salinity (conductivity), and TSS data were collected from eight cross sections from July 1995 to May 1996.

Notes:

Sources consulted to compile the information presented in the table include: TAMS and Malcolm Pirnie, Inc. (2005), Tierra (2003, 2004), Aqua Survey (2006), AECOM (2010, 2013), The Louis Berger Group (2014), and site databases (e.g., ourpassaic.org).

LPRSA: Lower Passaic River Study Area

MPI: Malcolm Pirnie, Inc.

NIDOT: New Jersey Department of Transportation

RI/FS: Remedial Investigation/Feasibility Study

RM: River Mile

Tierra: Tierra Solutions, Inc.

TSS: total suspended solids

USACE: U.S. Army Corps of Engineers

VSS: volatile suspended solids

Exhibit B

Vendor	2007 RI/FS ASAOC Reponse Costs
<i>De Maximis Inc. (DMI)</i>	
RI/FS Proj. Coordination	7,621,563.70
Fund Administration	475,503.46
RI Field Facility	1,087,164.90
Group Administration and Coordination	941,792.00
LRC Sampling	137,676.48
FSP2 Sampling	125,407.33
FSP2 Benthic Data Mgmt	294,276.75
Water Column Monitoring	31,296.89
FSP2 Tissue Data Management	137,177.99
CSO Invoice Review	868.18
River Mile 10.9	75,025.56
Supplemental Sampling	31,853.99
Aquaponics (Fish Exchange) Program	26,162.89
Tax Preparation	8,029.72
<i>AECOM</i>	46,864,545.00
<i>WindWard</i>	23,717,031.82
<i>Moffat & Nichol</i>	7,765,073.15
<i>Anchor QEA</i>	14,369,176.45
<i>MAB</i>	1,679,943.14
<i>CH2MHill</i>	2,311,051.16
<i>Tierra(CSO Study)</i>	1,600,000.00
<i>Integral</i>	3,881,195.68
<i>New York Academy of Science</i>	184,160.63
<i>U.S. Environmental Protection Agency (Oversight costs)</i>	23,931,515.94
<i>O'Brien & Gere</i>	518,993.93
<i>MKW</i>	90,959.50
<i>Rutgers University (Fish Exchange)</i>	2,532,214.99
<i>SUBTOTAL</i>	140,439,661.23
<i>(Paid By Tierra/Maxus before June 2012 Withdrawal)**</i>	-21,400,000.00
TOTAL	119,039,661.23

Exhibit C

Category/Vendor	2012 RM 10.9 ASAOB Reponse Costs	
DMI	\$	1,152,136.19
AECOM	\$	1,054,450.29
AQEA	\$	4,896.00
CH2M Hill (design)	\$	2,123,744.92
CH2M Hill (fieldwork)	\$	18,400,731.20
MAB Consulting	\$	29,821.34
Moffatt & Nichol	\$	30,954.00
WindWard	\$	8,040.96
U.S. Environmental Protection Agency (Oversight Costs)	\$	1,643,771.19
Credit due from EPA for Oversight Costs exceeding \$1.5 MM cap		-143,771.19
TOTAL (Current as of 9/2019)*	\$	24,304,774.90

* Additional costs for monitoring and oversight expected

Exhibit D

2004- May 2007 Costs*

DMI	1,512,455.65
AECOM	1,458,150.48
WINDWARD	172,074.54
122 (h) Settlement (excluding Tierra/Maxus payment)	12,640,000

TOTAL	15,782,680.67
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* Exclusive of PRP Search costs